

Poisson Regression

Test name: Poisson Regression

Dataset: D:/DATA ANALYSIS/H Regression Tests and Models/Poisson Regression/dataset.csv

Rows in original dataset: 649

Columns in original dataset: 33

Rows used in Poisson model: 649

Count outcome created: poisson_count = round(G3) clipped at zero

Numeric predictors: G1, G2, studytime, failures, absences, age

Categorical predictors: school, sex, address

Formula: poisson_count ~ G1 + G2 + studytime + failures + absences + age + school + sex + address

Family/link: poisson(link = 'log').

Pearson dispersion estimate: 0.2431

The fitted data show underdispersion rather than overdispersion.

Residual deviance: 247.0655

AIC: 3009.799

Interpretation: coefficients are log-rate effects; exp(coefficient) is the estimated rate ratio.

Decision guide: $p < 0.05$ and rate-ratio CI not crossing 1 indicates stronger evidence for a predictor effect.

Reporting guide: state count outcome, link, predictors, rate ratios, 95% CIs, AIC, deviance and dispersion conclusion.

Charts generated: 8

Poisson coefficients

model	term	log_rate_coefficient	standard_error	z_value	p_value	ci95_lower_log
Standard Poisson GLM	(Intercept)	1.575260575	0.179792197	8.7615625	1.925623e-18	1.22287434
Standard Poisson GLM	G1	-0.002184308	0.009062299	-0.2410324	8.095300e-01	-0.01994609
Standard Poisson GLM	G2	0.086380953	0.008828227	9.7846317	1.310716e-22	0.06907795
Standard Poisson GLM	studytime	0.002713571	0.014537950	0.1866543	8.519317e-01	-0.02578029
Standard Poisson GLM	failures	-0.040592612	0.025475365	-1.5934065	1.110690e-01	-0.09052341
Standard Poisson GLM	absences	0.002659519	0.002616731	1.0163517	3.094619e-01	-0.00246918
Standard Poisson GLM	age	-0.005936818	0.010292597	-0.5768046	5.640714e-01	-0.02610994
Standard Poisson GLM	schoolMS	-0.033380382	0.027698881	-1.2051166	2.281583e-01	-0.08766919
Standard Poisson GLM	sexM	-0.016781202	0.024140681	-0.6951420	4.869663e-01	-0.06409607
Standard Poisson GLM	addressU	0.008393997	0.027099893	0.3097428	7.567565e-01	-0.04472082
ci95_upper_log rate_ratio_exp_b rate_ratio_ci95_lower		rate_ratio_ci95_upper	decision_alpha_0_05			
1.927646806	4.8320006	3.3969377	6.873317	Statistically significant		
0.015577471	0.9978181	0.9802515	1.015699	Not statistically significant		
0.103683961	1.0902216	1.0715197	1.109250	Statistically significant		
0.031207429	1.0027173	0.9745492	1.031699	Not statistically significant		
0.009338185	0.9602202	0.9134529	1.009382	Not statistically significant		
0.007788218	1.0026631	0.9975339	1.007819	Not statistically significant		
0.014236302	0.9940808	0.9742280	1.014338	Not statistically significant		
0.020908428	0.9671706	0.9160639	1.021129	Not statistically significant		
0.030533663	0.9833588	0.9379149	1.031005	Not statistically significant		
0.061508812	1.0084293	0.9562644	1.063440	Not statistically significant		

Poisson fit statistics

	model	family	link	n	df_residual	null_deviance	residual_deviance	aic	pearson_dispersion	
Standard	Poisson	GLM	poisson	log	649	639	745.6073	247.0655	3009.799	0.2431391
									note	
									Poisson assumes the conditional variance is approximately equal to the conditional mean.	















